



**AMERICAN-MADE
INNOVATION** **SPARKING
ECONOMIC
GROWTH**

A selection of American innovation
success stories made possible
by federally funded research

VOLUME 3 • APRIL 2017



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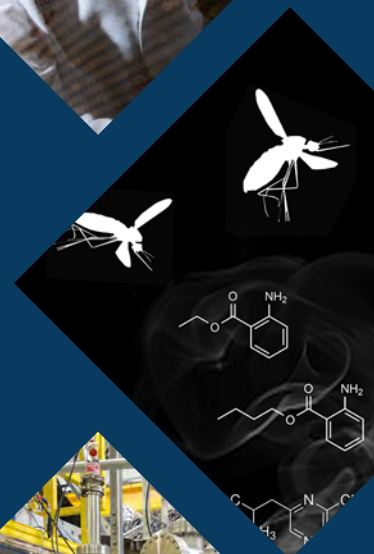
Epicrop Technologies co-founder Sally Mackenzie (photo courtesy of University of Nebraska; Tableau Software (photo courtesy of Stanford University); M3 Biotechnology co-founder Joe Harding and CEO Leen Kawas (photo courtesy of Washington State University); technology in development for NASA's Green Propellant Infusion Mission (photo courtesy of Ball Aerospace)

ABOUT THIS REPORT

This is the third **Sparking Economic Growth** report published by The Science Coalition. Each volume of the report has highlighted a different set of companies created from federally funded university research, totaling 302 companies to date. The reports are intended to showcase one of the ways that federal investment in basic scientific research helps stimulate the economy. All three reports and a database of companies are available at www.sciencecoalition.org/successstories.

All **Sparking Economic Growth** companies were self-selected by the member universities of The Science Coalition and are illustrative of the many companies that result from federally funded university research. Additionally, the funding amounts cited in this report and accompanying database were provided by the university affiliated with the particular company and should be considered estimates. The information about these companies was collected throughout 2016.

The Science Coalition is a non-profit, nonpartisan organization of leading public and private U.S. research universities. Its mission is to sustain strong federal funding of basic scientific research as a means to stimulate the economy, spur innovation and drive America's global competitiveness. Learn more about The Science Coalition at www.sciencecoalition.org.



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Individual write-ups on all **Sparking Economic Growth** companies, as well as a sortable database of companies, are available at

WWW.SCIENCECOALITION.ORG/SUCCESSSTORIES

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SPARKING DISCOVERY

All it takes is a spark of discovery, an “ah ha” moment, to realize a great opportunity — one that might change the world and have commercial value as well. But where does that spark come from? In the case of the companies highlighted in this report, that spark was basic scientific research — conducted at a U.S. university with funding support from America’s preeminent federal science agencies.

Every **Sparking Economic Growth** company is an American innovation success story. Each traces its roots back to federally funded academic research and is bringing to market transformational innovations in health, materials, technology, defense, manufacturing, education, or agriculture. Additionally, each of these companies is creating jobs and contributing to the local economy. Every **Sparking Economic Growth** company is a shining example of how America leads the world in science and technology — and why the United States must continue to invest robustly in basic scientific research to ensure that we maintain this leadership.¹

AN UNDERVALUED INVESTMENT

The public investment in the foundational research behind these companies was just over \$265 million² spread over several decades. This research of course also advanced our knowledge; educated future scientists, engineers and doctors; created direct jobs and equipment purchases; and helped build a skilled workforce. Research, and all the benefits that flow from it, help keep America globally competitive.

The federal government’s total R&D bill amounts to just 3.4 percent of the nation’s annual budget. The last time this number exceeded 5 percent of the budget was back in 1990, more than a quarter century ago. While basic research is the smallest slice of the R&D pie, accounting for less than 25 percent (\$33.5 billion) of the federal government’s total \$135.5 billion R&D budget in 2016,³ it is the spark that ignites discovery and innovation in the United States. The return on this modest investment is enormous.

DID YOU KNOW?

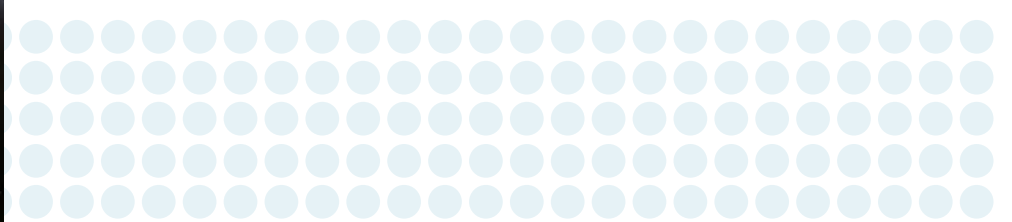
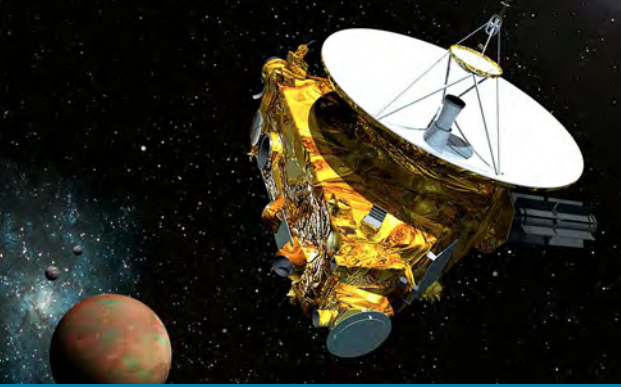
For every taxpayer dollar spent by the U.S. government, less than 1 cent goes toward federal funding for basic research.

FEDERAL BUDGET: \$3.54 TRILLION*



◀ **BASIC RESEARCH**
\$33.5 billion

*FY2016



BORN OF THE SPACE RACE

If WWII gave rise to the U.S. research enterprise, the successful launch of the Soviet satellite Sputnik in 1957 put it into hyper-drive. The United States responded to this challenge with a huge investment in science and engineering education and research and a commitment to create the world's best research enterprise.

It's not a coincidence that the oldest company highlighted in this **Sparking Economic Growth** report is **Ball Aerospace & Technologies Corp.** Ball Brothers Research Corporation, as it was called then, was founded in 1956 during the early days of the space program. The company's leaders were intent on pursuing government contract research to connect the company with a larger pool of scientific manpower and receive follow-on benefits from the resulting manufacturing process experience.

They turned to a group of **University of Colorado** (CU) physics students and professors to evaluate a weighing device that the company was developing. The CU group had been working to create the first biaxial pointing control for the U.S. Air Force, among other projects in the developing rocket field. The CU group ended up joining the recently formed Ball Brothers Research Corporation.

Twenty years before *Forbes* coined the term "start-up," these Boulder scientists were unknowingly laying the groundwork for a company that would become a key contributor to some of America's pioneering science missions.

AMERICA'S DISCOVERY & INNOVATION ECOSYSTEM

From its earliest days, the United States has been a place of great discovery and innovation. But the United States didn't get serious about creating a formal system for investing in and facilitating discovery and innovation until the conclusion of World War II. President Franklin D. Roosevelt asked his Director of the Office of Scientific Research and Development, Vannevar Bush, for recommendations on how to apply the highly successful wartime scientific research effort to peacetime endeavors. The recommendations from Dr. Bush, contained in a report called "Science, the Endless Frontier," led to the formation of the National Science Foundation in 1950 and formalized the arrangement between the federal government and universities to conduct research on behalf of the American people. This unique partnership has been a driving force behind the U.S. economy ever since.

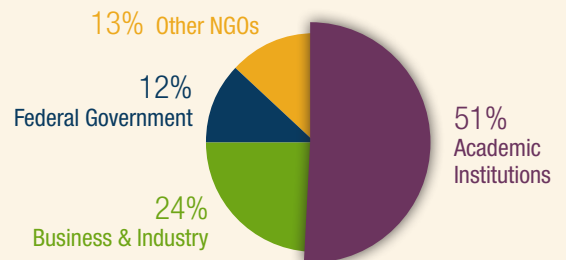
“The rewards of [scientific] exploration both for the Nation and the individual are great. Scientific progress is one essential key to our security as a nation, to our better health, to more jobs, to a higher standard of living, and to our cultural progress.”⁴

VANNEVAR BUSH • JULY 25, 1945

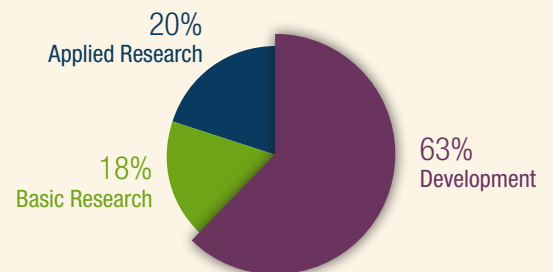
BASIC RESEARCH — THE SPARK THAT STARTS IT ALL

America's system of innovation and discovery begins with basic research, sometimes called discovery science because it is curiosity driven and seeks to fill in knowledge we don't have. While basic research is essential to the performance of applied research and the development of new technologies and commercial products, it is largely the domain of universities and academic institutions. Academic researchers are free to focus on their scientific missions — seeking answers to basic questions about life and the physical world — over many years without having to demonstrate commercial value. Commercialization was not the goal of the researchers behind these **Sparking Economic Growth** companies it was simply one outcome of their work. Industry, on the other hand, has a shorter time horizon and is driven by commercial outcomes, therefore focusing most of its efforts on applied research and development.

Who's doing basic research in the United States?



Breakdown of R&D conducted in the United States



Both Charts reflect total U.S. R&D funded by all sources⁵

BASIC RESEARCH — AN UNDERVALUED INVESTMENT

WHEN THE FEDERAL GOVERNMENT INVESTS IN BASIC SCIENTIFIC RESEARCH:



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Follow the quantum dots

These tiny semiconductor particles, 10,000 times narrower than a human hair, with special optical and electronic properties, play a big role in two very different **Sparking Economic Growth** companies.

At **Core Quantum Technologies (CQT)**, a spinout from **The Ohio State University**, quantum dots are enabling researchers to better identify and understand disease progression. In fact, it was a personal diagnosis of breast cancer and a desire to see her research impact patient health that led Jessica Winter to turn her team's advances in nanotechnology into commercial tools for cancer research and diagnosis. CQT's product, the MultiDot, which consists of a group of semi-conductor nanoparticle quantum dots encapsulated in polymer-based micelles, allows researchers to continuously track tagged molecules with greater brightness, longevity and stability than currently available technologies. This could enable researchers to better identify and understand disease progression as well as contribute to better clinical diagnosis. [NSF-funded research]

Three thousand miles away in California's Silicon Valley, **Nanosys** has been using quantum dot technology since 2001 to



“This technology was originally conceived to answer research questions in biology. As commercial implications became more evident and successful prototypes were achieved, the [NSF] I-Corps program helped leverage this technology into the commercial arena. But, our work would not have been possible without federal support of basic research.”

JESSICA WINTER
CQT FOUNDER AND PROFESSOR OF BIOMEDICAL ENGINEERING
THE OHIO STATE UNIVERSITY

provide uncompromised color accuracy and brightness for energy efficient electronic displays including tablets, smartphones, laptops and HD televisions. Known as The Quantum Dot Company™, Nanosys grew out of breakthrough research conducted at the **Lawrence Berkeley National Laboratory (LBNL)** in conjunction with the **University of California, Berkeley**. It was at LBNL that researchers discovered that these nanocrystals could be made to emit multiple colors of light depending on their size. Bigger dots emit longer wavelengths like red, while smaller dots emit shorter wavelengths like green. The ability of quantum dots to precisely convert and tune a spectrum of light makes them ideal for LCD displays. [DOE-funded research]

Tackling type 1 diabetes

These neighboring companies are pursuing very different solutions to type 1 diabetes.



At **Boston University** spinout **Beta Bionics**, their “bionic pancreas” is intended to provide a technology solution until there is a cure for diabetes. Beta Bionics co-founder Ed Damiano’s mission to engineer a way to automatically control blood sugar levels began soon after his infant son was diagnosed with diabetes in 2000. The company’s solution, called the iLet™, is a pocket-sized, wearable medical device that autonomously monitors and manages blood sugar levels in people with diabetes on a 24/7 basis. Beta Bionics hopes to have its first product on the market by the end of 2018. [NIH-funded research]



semma
THERAPEUTICS

Over at **Semma Therapeutics** in Cambridge, MA, they are working to turn stem cells into insulin-producing cells for patients with type 1 diabetes, which would transform treatment of this disease. While a post-doctoral fellow at the **Harvard University Stem Cell Institute**, company co-founder Felicia Pagliuca and her research team identified a way to turn stem cells into functional, insulin-producing cells on a mass scale. The company is focused on combining these proprietary cells with a state-of-the-art device that would let doctors transplant millions of cells in diabetic patients, without immunosuppression, and enable them to generate insulin. [NIH-funded research]

“It’s virtually impossible to overstate how important NIH and U.S. government funding for basic research is to the entire enterprise of medical research.”

FELICIA PAGLIUCA
SCIENTIFIC CO-FOUNDER AND VICE PRESIDENT
CELL BIOLOGY RESEARCH AND DEVELOPMENT, SEMMA THERAPEUTICS

Growing food sustainably

As the world's population continues to grow and human activity places increasing stress on the environment, finding new ways to increase crop yields is a global challenge. Three **Sparking Economic Growth** companies are pursuing solutions to this problem.

University of Nebraska spinout **Epicrop** is focused on the plant itself and using its epigenetic technology to improve a plant's stress tolerance and crop yield. Epigenetic modifications are naturally occurring biological marks on the plant's DNA, or chromatin. These marks help the plant develop normally and to adapt to its environment. Epicrop's technology is able to improve crop yields and stress tolerance by altering these marks without changing the DNA sequence of the plant. The final crop plant is genetically identical to the starting plant and contains no foreign genes or changes to the plant's DNA sequence. [NSF and DOE-funded research]



Tule Technologies' irrigation system lets growers know when and how much to water their crops, maximizing yield and quality while also carefully managing water usage. The **University of California, Davis** spinout company's technology measures "evapotranspiration," the total amount of water leaving the plant and soil system, and efficiently irrigates by replacing only what is lost. [USDA-funded research]



"This is one of those great 'could not have predicted it' discoveries that comes about from federally funded research into important basic biological processes."

DR. SALLY MACKENZIE
EPICROP FOUNDER AND PROFESSOR OF AGRONOMY
UNIVERSITY OF NEBRASKA-LINCOLN

InterSeeder Technologies began as a research project at **Penn State University** to help farmers have greater success using cover crops. Cover crops provide many benefits, including improving soil nutrients and reducing erosion and runoff. The project using an early version of the InterSeeder™ planting tool, which allows the planting of cover crop within rows of cash crops much earlier in the year, produced stunning results — a consistent and lush stand of cover crops growing under a dense corn canopy, followed six weeks later by a corn harvest with no yield penalty. [USDA-funded research]

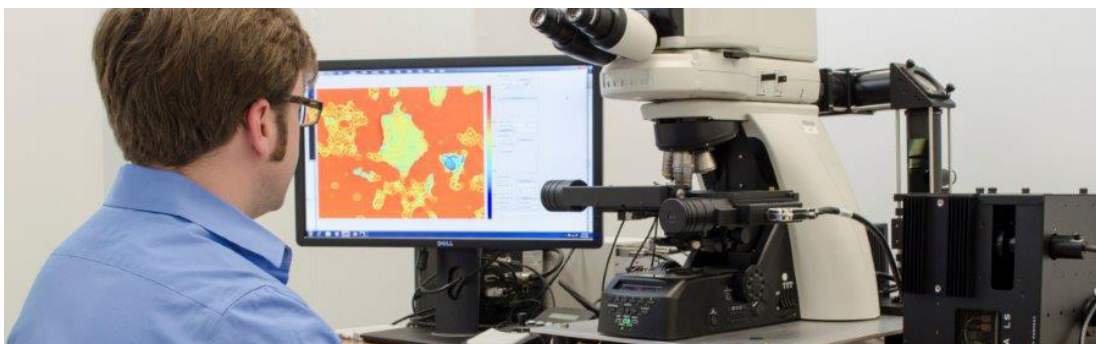


Yes, we've got a test for that

Technological advancements are enabling the development of simple, fast tests to detect and prevent many serious medical conditions. **Sparking Economic Growth** companies are part of this trend, developing tests for cancer, platelet function, stroke, and sudden cardiac death.

Preora Diagnostics and Liquid Biotech USA are both developing cancer screening tests.

PreoraDX's tests screen for the most common types of solid-tumor cancers and are simple enough to be performed in a physician's office without extensive preparation. Its proprietary technology — Partial Wave Spectroscopic (PWS) Nanocytology imaging — was developed at **Northwestern University** and detects and measures cellular changes at the nanoscale. By detecting changes on such a tiny scale, the tests may aid in risk assessment and early detection of cancers in high-risk, asymptomatic patients. [NIH and NSF-funded research]



Liquid Biotech's methodology is based on “liquid biopsy” technology developed at the **University of Pennsylvania**. It analyzes live, circulating tumor cells (CTCs) directly from patient blood and can detect the presence of CTCs in the blood when they are present at very low levels, offering the potential to manage the disease early in development. This approach also can guide physicians during treatment, as well as post-treatment, when a patient is in remission but there is the likelihood of recurrence. [NIH-funded research]

“It's not an exaggeration to say that none of it would have been possible without federal funding.”

VADIM BACKMAN

PREORADX CO-FOUNDER AND PROFESSOR OF BIOMEDICAL ENGINEERING
NORTHWESTERN UNIVERSITY





At **Stasys Medical Corporation** in Seattle, they've developed a point-of-care device that conducts a platelet function measure in a matter of minutes, enabling doctors to make better, time-sensitive decisions about performing platelet transfusions. This is critical in major trauma patients, who can die unnecessarily from uncontrolled bleeding often caused by platelet dysfunction. Stasys' technology, developed by a mechanical engineer at **University of Washington**, uses disposable micro-cards that have proprietary platelet force sensors to enable complete platelet function measures in less than five minutes. [DoD-funded research]

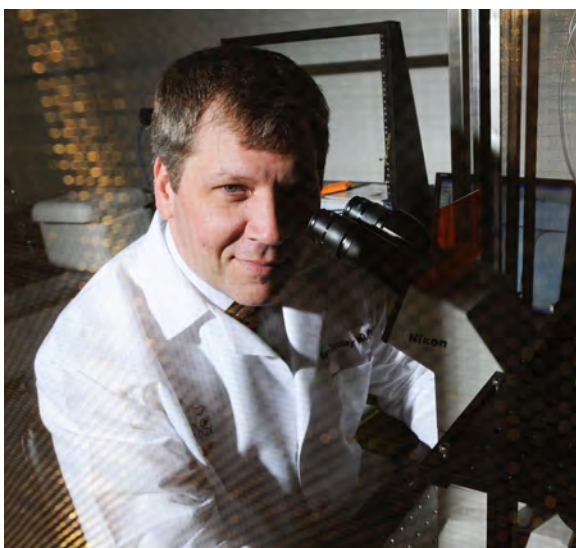
Nearly 800,000 people a year in the United States will suffer a stroke and getting proper treatment within three to four hours of symptom onset is essential to preventing death and improving the odds of successful recovery. **Valtari Bio** is developing a blood test to aid in the immediate identification of suspected stroke patients. It is the first of its kind, an easy to use blood test that provides fast, unbiased, and accurate identification of stroke versus stroke-mimic in emergency settings. It works by measuring the pattern of immune response in biomarkers found in the peripheral blood. The test is based on the research of Dr. Taura Barr of the **West Virginia University** School of Nursing and Emergency Medicine.

[DoD and NIH-funded research]



“My ‘ah ha’ moment came when we started digging into the market analysis, and I realized that our stroke diagnostic had the potential to touch three million patients annually in the United States. Even more exciting, was the realization of what rapid diagnosis meant to patient outcomes and recovery.”

VALERIE M. GIONIS
COO, VALTARI BIO



The PulsePredic™ by **3PrimeDx** uses biomarkers in the blood to predict sudden cardiac death (SCD) risk in patients with heart failure. Heart failure occurs in more than 3.5 million Americans each year, but there are no simple, reliable ways of predicting who is at highest risk for SCD and who will benefit from an implanted defibrillator. This blood test will enable the optimization of the intervention through a simple, reliable, convenient to administer, and cost-effective diagnostic tool. It is based on research conducted at the **University of Illinois at Chicago**.

[NIH-funded research]

Controlling indoor environments



FreshAir Sensor co-founder Jack O’Toole’s “ah ha” moment came when he heard his future business partner talk about his nicotine sensor. O’Toole intensely disliked cigarette smoke, yet he continued to be exposed to it by other people. He knew there must be a business in protecting people from unwanted exposure to smoking.

Marketed to hotels and property managers as a way to maintain safer and healthier environments for their residents and guests, **FreshAir Sensor’s** plug-in device, the FreshAir1, protects people from unwanted exposure to secondhand smoke. It provides continuous monitoring and detection of smoking in unauthorized areas, immediate email notification when cigarette smoke is detected and scientific proof via a timestamped chart that smoking occurred. The polymer-based sensors at the heart of FreshAir’s product were developed at **Dartmouth**. [NIH and NSF-funded research]



“The federal funding was truly foundational: upon a platform for water sampling, we built new key knowledge to enable lifestyle changes. Limiting the scope of the project, without following the spark of innovation, would have limited the potential impact.”

JONATHAN SPRINKLE
CO-FOUNDER, ACOMNI
AND ASSOCIATE PROFESSOR
UNIVERSITY OF ARIZONA COLLEGE OF ENGINEERING

University of Arizona spinout **Acomni** has developed the Ondo™, a Wi-Fi enabled thermostat-monitoring device that gathers data about a home’s heating, ventilation, and air conditioning (HVAC) cycle use. By combing utility rates and weather forecasts with a patent-pending behavioral learning algorithm, Ondo is able to learn a home’s heating and cooling requirements and provide electric utility companies with the ability to visualize energy expenses and estimate future heating and cooling costs. For homeowners, Ondo enables them to heat or cool their home — based on not just comfort, but also on how much they want to spend on electricity. [NSF-funded research]



Powering new approaches to energy storage

Our high-tech world requires a different type of power: power that is compact, versatile, mobile and super-efficient as well as safe. These three companies are pushing the limits of what's possible when it comes to energy storage and power.

In a research course at **MIT**, a teaching assistant and two of his students conducted what they call a “modest experiment in a beaker.” It involved a small enriched blob of gallium in water and a platinum wire “so thin you could barely see it.” It turned out to be the first demonstration of **Open Water Power's** technology: an aluminum-water platform technology for underwater energy storage and power generation. And, it's anything but modest. It solves a significant endurance problem for the U.S. Navy and the oil and gas industry. Open Water Power's electrochemical system provides safe, scalable and non-toxic energy storage with extremely high energy density, promising a 10x improvement in the endurance of unmanned underwater vehicles and sensors. [DoD-funded research]



“That our technology addresses a critical need within the federal government’s Department of Defense adds additional emphasis to the value of federal research funding.”

OPEN WATER POWER FOUNDERS

The **Paper Battery Company** — which manufactures an ultrathin high-energy supercapacitor that enables companies to replace batteries or use smaller batteries without compromising energy or peak performance — happened almost by accident. A professor of chemistry at **Rensselaer Polytechnic Institute**, Robert Linhardt, was trying to perfect a blood thinner-containing membrane for hemodialysis when he turned to a colleague, Pulickel Ajayan, in the university’s Nanotechnology Center for help. Linhardt thought carbon nanotubes might increase the strength of his membranes. Their first approach was to merge Linhardt’s cellulose with aligned carbon nanotubes and test it for strength. Upon seeing the new membrane, a student observed that if they folded it in half, they would have a supercapacitor. The student was right and the concept of a paper battery — a patented form factor solution that allows for revolutionary size changes in wearables, accessories, and mobile electronics — was born. [NSF-funded research]



“[Our ‘ah ha’ moment] is the product of smart students seeing something that was not apparent to any one group, and seizing that opportunity.”

ROBERT LINHARDT
CO-FOUNDER, PAPER BATTERY COMPANY
AND PROFESSOR OF CHEMISTRY
RENSSELAER POLYTECHNIC INSTITUTE

Silatronix The two **University of Wisconsin-Madison** professors behind **Silatronix** knew they were onto something big with their

Organosilicon (OS) materials when a major global lithium-ion battery manufacturer told them of an unexpected benefit of their electrolyte — a new mechanism for improving the performance and safety of Li-ion batteries. Silatronix patented OS compounds extend cell life, increase cell capacity, expand temperature operability ranges, and allow the safe and effective use of higher charge voltages in Li-ion batteries. [NIST and NSF-funded research]



Science fiction only better

Many **Sparkling Economic Growth** companies are pursuing technologies that are just plain cool. Here are three with a serious SciFi factor that are addressing real health and safety needs.



It wasn't until the press picked up and reported their research that the founders of EpiBone thought about the potential commercial applications of what they were doing. "This was an 'ah ha' moment of sorts because it gave us the idea and led to our first invitation to apply for a translational research grant."

NINA TANDON
CO-FOUNDER, EPIBONE

EpiBone, created from research at **Columbia University**, is in the business of growing personalized bone grafts. Using a CT scan to create a precise 3D model of the anatomical defect, stem cells taken from the patient, and a custom-built bioreactor, EpiBone is able to grow a personalized bone graft — in the exact size and shape needed — that is ready for implantation. For the more than 900,000 patients who undergo bone-related surgeries each year, EpiBone's technology offers the potential for greatly improved outcomes. [NIH-funded research]

Auxadyne's foam technology is counter-intuitive; it expands outward when stretched. This means it gets thicker rather than thinner with impact, making it ideal for protective equipment, medical devices and other applications. Indeed, the foam is so novel that within a few weeks of news announcing plans to commercialize this **Florida State University** technology, Auxadyne was contacted by top sporting equipment companies, medical device makers and manufacturers of ballistic vests, all interested in how the foam might be used in their products. [VA and DoD-funded research]



"As a direct result of this VA research funding, Auxadyne will create high-tech, high-wage manufacturing jobs in Florida allowing us to make the lives of leg amputees, military personnel, first responders and athletes of all ages safer."

JOE CONDON
PRESIDENT AND CEO, AUXADYNE



"Born from an Army Research Lab and perfected in the labs of two, public universities, the federal funding TriFusion received has allowed an idea to become a life-changing technology."

BLAKE TEIPEL
CEO, TRIFUSION DEVICES

TriFusion has figured out how to solve one of the biggest challenges with 3D printing, the tendency of the layers to peel apart or break under heat or stress. The **Texas A&M** spinout aims to use its combination of proprietary heat-responsive nanoparticles and precision electric fields to simplify and expedite the process of manufacturing custom prosthetic devices, and to do it at a lower cost. Its goal is to bring affordable prosthetic limbs to those who need them most. [DoD and NSF-funded research]

I'll see your need and raise you ...

It's said that necessity is the mother of invention. These three companies definitely saw a need and knew there was a better way.

Codapillar is an education technology platform that teaches middle school and high school students how to code. It was the brainchild of **Pace University** undergrads — Julie Gauthier and Olga Bogomolova — who worked together at a camp for high school students interested in the STEM disciplines. After trying various resources to help students learn coding, the same problems kept surfacing. Their students were getting frustrated and so were they. This led Gauthier and Bogomolova to decide to go “off-book,” create a custom curriculum, and teach students the tools that professional web developers were using. The results were dramatic in terms of student success and happiness. [NSF-funded research]



“As women in technology, we believe in helping to improve diversity in technology. It simply would not be possible without federal funding to sponsor programs that reach under-represented populations.”

JULIE GAUTHIER AND OLGA BOGOMOLOVA
CO-FOUNDERS, CODAPILLAR



For PhotoniCare’s founders, their ‘ah ha’ moment came the first time they used their technology to see through the eardrum of a patient. “The disease in the middle ear becomes so obvious when you can visualize it directly. It was then that we knew that our technology was going to revolutionize the way middle ear infections are diagnosed and treated.”

Ear infections are the leading cause of hearing loss and surgeries in children, yet they are still diagnosed using the otoscope. The otoscope is essentially a magnifying glass that allows physicians to look at the surface of the eardrum but leaves them guessing at what might be going on in the inner ear. Frustrated by their own experiences — one a physician and all fathers of young children with chronic ear infections — the founders of **University of Illinois at Urbana-Champaign** spinout **PhotoniCare**, have developed a version of the otoscope that enables doctors to look through the eardrum into the middle ear in order to see and better treat disease. [NIH and NSF-funded research]



Their original assignment was to increase people’s ability to analyze information. What they did, however, was take data analysis and presentation to a whole new level. Working on a Defense Department project in the early 2000s at **Stanford University**, the founders of **Tableau Software** realized that computer graphics could deliver huge gains in people’s ability to understand data so they did something that hadn’t been done before: they brought together databases and computer graphics. The resulting invention, VizQL™, let people analyze data just by building “drag & drop” pictures of what they wanted to see. Tableau has been revolutionizing business analytics ever since. [DoD-funded research]

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THE OTHER SPINOUT — TRAINED, WORKFORCE-READY EMPLOYEES

The Rockford region of northern Illinois and southern Wisconsin is home to some 200 aerospace-related companies. Keeping these companies supplied with engineers, scientists and technicians is no small feat and is essential to their competitiveness and to the economic vitality of the region. This is why regional business and academic leaders are collaborating to create a pipeline of skilled talent. In 2012, the region won a federal Jobs and Innovation Accelerator Challenge grant, applying \$2.4 million to strategies to accelerate job creation, global competitiveness and innovation. This work catalyzed a regional strategy to “grow our own workforce.” The first outcome was the creation of a targeted internship program, providing high school and college students in the region a path to high-quality paid internships, and for employers, a pipeline of skilled talent.

Local leaders also realized that providing more local opportunities for engineering education would be key in educating and retaining new talent in the region. Thus, in the fall of 2016, **Northern Illinois University (NIU)** and **Rock Valley [Community] College (RVC)** launched a community-based, industry-integrated engineering degree program in Rockford. Students move seamlessly from the first two years of engineering studies to bachelor’s completion programs in mechanical engineering and applied manufacturing technology taught at RVC by professors from NIU’s ABET-accredited College of Engineering & Engineering Technology. Rockford area industry has contributed \$5 million so far to support renovations to RVC classrooms and laboratories, instructional support and student scholarships. Students have paid internships with local companies and are mentored by NIU and RVC alumni working in the region. This collaborative workforce development solution is being hailed by industry leaders as key to business retention and expansion in the Rockford region.



COMPANY STATUS

The companies span in age from 61 years to just over 1 year, with the large majority of companies (73) founded since 2010. Half of the companies (56) were formed in 2012 or more recently, making them younger than five years old. Of the 102 companies, 10 have been acquired by or merged with other companies (public and private), eight are publicly held and 84 are private.

Decade Founded

1950s	➤	1
1990s	➤	6
2000s	➤	22
2010s	➤	73

Status

Acquired/Merged	➤	10
Public	➤	8
Private	➤	84

BRIDGING THE GAP BETWEEN INNOVATIVE RESEARCH AND THE MARKETPLACE

Called the “valley of death,” it arises when funding for a research project runs out but the researcher hasn’t yet been able to secure external funding from investors to continue the work necessary to take an innovation all the way to the marketplace. **Seventy-one of the 102 Sparking Economic Growth companies reported receiving some type of venture funding, indicating the importance of this type of financing.** Universities are increasingly stepping into this space with innovative programs to help bridge the funding gap.

Auburn University instituted its LAUNCH awards program in 2015 to support the efforts of Auburn faculty in bringing promising research to the marketplace. The goal is to establish an endowment of \$10 million that will generate approximately \$400,000 annually for research project grants. Until the endowment is fully funded, the Office of the Vice President for Research and Economic Development will provide the resources to make the awards. “Auburn researchers have the will and the talent to provide real solutions for the challenges in today’s market. Activities like LAUNCH reflect Auburn’s land-grant tradition and the university’s commitment to fuel economic growth with science-based innovation,” explains Auburn University Vice President for Research and Economic Development John Mason. The first round of LAUNCH award recipients are pursuing innovations aimed at preventing MRSA in livestock, improving wound healing and reducing dangerous infections, and preventing spontaneous combustion of hay bales and the huge financial losses that result when such fires happen.



TRANSFORMATIONAL INNOVATIONS

The innovations behind the **Sparking Economic Growth** companies touch all aspects of society and the economy. A majority of companies consider their work to be in the biomedical space. This broad category includes drugs, devices and diagnostics, as well as tools and materials that support biomedical research.

Area of Innovation		
	Agriculture & Environment	2
	Biomedical	66
	Defense, Safety & Aerospace	2
	Education & Language	3
	Energy & Chemicals	5
	Manufacturing, Research & Industry	4
	Materials	5
	Technology & Web	15

SPARKING ECONOMIC GROWTH REQUIRES STEADY INVESTMENT

Federally funded university research is building a better America. The 102 companies highlighted in this version of The Science Coalition's **Sparking Economic Growth** report are perfect examples of how this is happening across the nation.

These American innovation success stories also illustrate why it is essential that our government prioritize funding for basic scientific research. Without the sustained federal funding for basic scientific research that occurred years ago, none of these companies would exist today. **Reducing research funding today puts at risk the next generation of job-creating, innovation-producing, and economic growth-contributing companies, along with all of the other benefits that result from federally funded basic scientific research.**

A database of all **Sparking Economic Growth** companies is available at

WWW.SCIENCECOALITION.ORG/SUCCESSSTORIES

¹“U.S. Science and technology leadership increasingly challenged by advances in Asia,” National Science Board, January 19, 2016: https://www.nsf.gov/nsb/news/news_summ.jsp?cntn_id=137394&org=NSB&from=news.

²Universities and/or company founders were asked to estimate the amount of federal funding that contributed to the foundational research at the root of their company's technology. Estimates were provided for 92 out of 102 companies, totaling \$265,019,045.

³The data in this paragraph is derived from tables developed by the American Association for the Advancement of Science, including “Federal R&D as a Percent of GDP” and “R&D as a Percent of the Total Federal Budget.” The tables are available here: <https://www.aaas.org/page/historical-trends-federal-rd>.

⁴“Science The Endless Frontier, A Report to the President by Vannevar Bush, Director of the Office of Scientific Research and Development, July 1945.” See transmittal letter: <https://www.nsf.gov/od/pa/nsf50/vbush1945.htm>.

⁵National Science Foundation, “Science and Engineering Indicators 2016,” Chapter 4: <https://www.nsf.gov/statistics/2016/nsb20161/#/>.

⁶Only about 35 percent of establishments remain in business at 10 years according to data from the Bureau of Labor Statistics on “Entrepreneurship and the U.S. Economy,” https://www.bls.gov/bdm/entrepreneurship/bdm_chart3.htm.

⁷“Frequently Asked Questions,” U.S. Small Business Administration Office of Advocacy, June 2016: https://www.sba.gov/sites/default/files/advocacy/SB-FAQ-2016_WEB.pdf.

⁸The total number of employees reported is 8,901. Employee counts are not included for two small companies that were acquired and subsumed by much larger companies, Emotient by Apple and Inktank by Red Hat.

⁹According to the U.S. Small Business Administration Office of Advocacy, 80 percent of small businesses do not have any paid employees: https://www.sba.gov/sites/default/files/advocacy/SB-FAQ-2016_WEB.pdf.

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COMPANIES AT-A-GLANCE

COMPANY	LOCATION	FOUNDED	UNIVERSITY	EMPLOYEES	STATUS	INNOVATION	FUNDING AGENCY	AMOUNT
3PrimeDx, Inc.	Chicago, IL	2014	University of Illinois at Chicago	7	Private	Diagnostic blood test to predict and prevent sudden cardiac death risk	National Institutes of Health	\$1,400,000
Acomni, LLC	Tuscon, AZ	2014	University of Arizona	3	Private	Technology to forecast a home's heating and cooling expenses, letting users decide how much they wish to spend	National Science Foundation	\$350,000
Adarza Biosystems, Inc.	West Henrietta, NY	2008	University of Rochester	21	Private	Label-free biosensor assays and instruments for life science research and drug development	National Institutes of Health	\$1,000,000
Aeglea BioTherapeutics	Austin, TX	2013	University of Texas at Austin	30	Public	Treatments for genetic rare diseases and cancers associated with abnormal amino acid metabolism	National Institutes of Health	not available
Agilis Biotherapeutics	Cambridge, MA	2013	University of South Florida	4	Private	DNA therapeutics for rare genetic diseases affecting the central nervous system	National Institutes of Health	\$2,000,000
AGTC	Alachua, FL	1999	University of Florida	58	Public	Using gene therapy to develop cures for rare eye diseases	National Institutes of Health	\$7,040,000
AnswerDash, Inc.	Seattle, WA	2013	University of Washington	17	Private	Contextual self-service help for websites	National Science Foundation	\$510,000
Aortica Corporation	Bellevue, WA	2014	University of Washington	9	Private	Software enables physician modification of endografts for treatment of complex abdominal aortic aneurysms	National Institutes of Health	\$303,000
Applied Dexterity, Inc.	Seattle, WA	2012	University of Washington	4	Private	The RAVEN surgical robotics research platform	Department of Defense, National Science Foundation	\$635,045
Arvinas, Inc.	New Haven, CT	2013	Yale University	31	Private	Drugs for blood cancers that "tag" disease-causing proteins for destruction	National Institutes of Health	\$2,000,000

COMPANY	LOCATION	FOUNDED	UNIVERSITY	EMPLOYEES	STATUS	INNOVATION	FUNDING AGENCY	AMOUNT
AsclepiX Therapeutics, LLC	Baltimore, MD	2011	Johns Hopkins University	4	Private	Using bioinformatics to develop peptide drugs for ocular diseases	National Institutes of Health	\$1,500,000
Auxadyne, LLC	Keystone Heights, FL	2015	Florida State University	1	Private	High performance foam padding for medical devices and protective equipment	Department of Defense, Department of Veterans Affairs	\$4,900,000
Ball Aerospace & Technologies Corp.	Broomfield, CO	1956	University of Colorado Boulder	2,800	Public	Instruments, spacecraft, data exploitation solutions and technologies for civil, commercial, aerospace and defense applications	Department of Defense	not available
Beta Bionics, Inc.	Boston, MA	2015	Boston University	12	Private	Portable, wearable electronic device to automate type 1 diabetes management	National Institutes of Health	\$9,200,000
BioFront Technologies	Tallahassee, FL	2011	Florida State University	1	Private	Technologies and services for detecting food allergens and infectious diseases	Department of Agriculture, National Institutes of Health	\$1,300,000
Blackrock Microsystems	Salt Lake City, UT	2008	University of Utah	50	Private	Advanced tools for neuroscience, neural engineering and neuro-prosthetics research and clinical work	Department of Defense, National Institutes of Health	\$12,000,000
BluHaptics, Inc.	Seattle, WA	2013	University of Washington	6	Private	Technology enables telerobotic work in complex and challenging environments	National Science Foundation	\$325,000
Caribou Biosciences, Inc.	Berkeley, CA	2011	University of California, Berkeley	38	Private	New applications for CRISPR-Cas gene editing	National Institutes of Health, National Science Foundation	\$1,320,000
CartoFusion Technologies, Inc.	Corpus Christi, TX	2015	Texas A&M University	3	Private	Mapping software allows multiple people to simultaneously and collaboratively make maps	National Science Foundation	\$100,000
Clerio Vision, Inc.	Rochester, NY	2014	University of Rochester	12	Private	Vision correction procedure non-invasively writes a corrective prescription onto the cornea	National Institutes of Health	\$2,000,000

COMPANY	LOCATION	FOUNDED	UNIVERSITY	EMPLOYEES	STATUS	INNOVATION	FUNDING AGENCY	AMOUNT
Codapillar Inc.	New York, NY	2015	Pace University	2	Private	Education technology platform that teaches middle and high school students how to code	National Science Foundation	\$20,000
Codelucia, LLC	Tuscon, AZ	2012	University of Arizona	3	Private	Error correction technology for next generation solid state drives	National Science Foundation	\$1,000,000
Conidio Tec, LLC	State College, PA	2014	Penn State University	0	Private	Non-toxic product prevents and controls bed bugs	Department of Agriculture	\$70,000
ContraFect Corporation	Yonkers, NY	2010	The Rockefeller University	50	Public	Therapeutic proteins and antibodies to treat deadly drug-resistant diseases	Department of Defense	\$4,000,000
Core Quantum Technologies, Inc.	Columbus, OH	2012	The Ohio State University	2	Private	Using quantum dots for cancer detection	National Science Foundation	\$620,000
Crossbar, Inc.	Santa Clara, CA	2010	University of Michigan	50	Private	ReRAM memory chips and IP blocks	National Science Foundation	\$700,000
CytomX Therapeutics, Inc.	South San Francisco, CA	2010	University of California, Santa Barbara	60	Public	Cancer therapies that remain inactive in the body until reaching their intended target	National Institutes of Health, National Science Foundation	\$1,300,000
Dataware Ventures, LLC	Tuscon, AZ	2012	University of Arizona	9	Private	Software that speeds up the flow of data through applications, optimizing performance	National Science Foundation	\$1,600,000
DoseOptics LLC	Lebanon, NH	2015	Dartmouth	5	Private	Novel camera provides real-time tracking and verification of radiation dosage to patients	National Institutes of Health	\$3,400,000
ECM Technologies, LLC	Houston, TX	2007	Texas A&M University	1	Private	Designer collagens developed from non-animal proteins for biomedical use	National Institutes of Health	\$50,000
eFFector Therapeutics	San Diego, CA	2013	University of California, San Francisco	27	Private	Drugs to treat cancer by selectively regulating protein synthesis	National Institutes of Health	\$5,000,000
Emotient, now part of Apple	San Diego, CA	2012	University of California, San Diego	N/A	Acquired 2016	Software uses facial recognition technology to detect consumer emotions	Department of Defense, National Institutes of Health, National Science Foundation	\$1,500,000
Emu Solutions Inc.	South Bend, IN	2010	University of Notre Dame	20	Private	Exascale-capable computing architecture designed for Big Data	Department of Defense	\$6,000,000

COMPANY	LOCATION	FOUNDED	UNIVERSITY	EMPLOYEES	STATUS	INNOVATION	FUNDING AGENCY	AMOUNT
EpiBone, Inc.	Brooklyn, NY	2013	Columbia University	15	Private	Personalized, anatomically correct bone grafts	National Institutes of Health	\$4,600,000
Epicrop Technologies Inc.	Lincoln, NE	2013	University of Nebraska	8	Private	Epigenetic-based technology that improves crop yields without affecting plant DNA	Department of Energy, National Science Foundation	\$600,000
FastBridge Learning, LLC	Minneapolis, MN	2015	University of Minnesota	20	Private	Evidence-based classroom assessments to support individualized instruction decisions	Department of Education	\$10,000,000
FORGE Life Science	Doylestown, PA	2012	Princeton University	8	Private	Broad spectrum antivirals and vaccines	National Institutes of Health	\$300,000
FreshAir Sensor LLC	Lebanon, NH	2013	Dartmouth	14	Private	Novel sensors that detect and report nicotine and marijuana smoke in unauthorized areas	National Institutes of Health, National Science Foundation	\$450,000
gel-e Life Sciences	College Park, MD	2010	University of Maryland	3	Private	A material, available in multiple forms, which can stop almost any type of bleeding	National Science Foundation	\$500,000
Gemstone Biotherapeutics LLC	Baltimore, MD	2013	Johns Hopkins University	5	Private	Regenerative wound-care technology	National Institutes of Health	\$4,000,000
Genome Profiling LLC	Newark, DE	2014	University of Delaware	10	Private	Novel epigenetic biomarkers from next-generation genome sequencing data to accelerate the promise of precision medicine	National Science Foundation	\$800,000
GPB Scientific, LLC	Richmond, VA	2002	Princeton University	10	Private	Liquid biopsy technology isolates and identifies tumor cells in the blood	Department of Defense, National Institutes of Health, National Science Foundation	not available
Guavus Inc.	San Mateo, CA	2006	Boston University	250	Private	Big Data analytics operations for businesses	National Science Foundation	\$6,000,000
Hexatech Inc.	Morrisville, NC	2001	North Carolina State University	22	Private	Aluminum nitride semiconductor crystals	Department of Defense	\$5,000,000
HistoSonic, Inc.	Ann Arbor, MI	2010	University of Michigan	13	Private	Histotripsy tool for precise tissue ablation	National Institutes of Health	\$6,500,000
HylaPharm	Lawrence, KS	2010	University of Kansas	8	Private	Chemotherapies that are injected directly into a tumor to treat locally advanced cancers	Department of Defense, National Institutes of Health	\$2,500,000

COMPANY	LOCATION	FOUNDED	UNIVERSITY	EMPLOYEES	STATUS	INNOVATION	FUNDING AGENCY	AMOUNT
IDx, LLC	Iowa City, IA	2010	University of Iowa	17	Private	A fully automated tool for retinal imaging and disease detection	Department of Agriculture, National Institutes of Health, Department of Veterans Affairs	\$2,750,000
InkTank, now part of Red Hat	Raleigh, NC	2012	University of California, Santa Cruz	N/A	Acquired 2014	Open-source cloud storage software for data systems	Department of Energy	\$5,000,000
IntelliCyt Corporation	Albuquerque, NM	2006	University of New Mexico	55	Acquired 2016	High throughput cell screening solutions for drug discovery and research	National Institutes of Health	not available
InterSeeder Technologies LLC	Woodward, PA	2014	Penn State University	2	Private	Tool enables efficient planting of cover crops between rows of cash crops	Department of Agriculture	\$10,000
Itaconix Corporation, a wholly-owned subsidiary of Revolymer plc	Stratham, NH	2008	University of New Hampshire	19	Acquired 2016	Bio-based polymers made from itaconic acid for use in detergents, personal care products and industrial coatings	National Science Foundation	\$320,000
Kapteyn-Murnane Laboratories Inc.	Boulder, CO	1994	University of Colorado Boulder	28	Private	Ultrashort-pulse femtosecond laser systems for imaging, measurement and research	National Science Foundation	\$7,500,000
Klogene Therapeutics, Inc.	Boston, MA	2015	Boston University	5	Private	Small molecule drug for treatment of Alzheimer's disease	National Institutes of Health	\$1,490,000
Liquid Biotech USA, Inc.	Audubon, PA	2015	University of Pennsylvania	2	Private	A rapid, non-invasive "liquid biopsy" test for cancer screening and early detection	National Institutes of Health	\$932,000
LiquiGlide Inc.	Cambridge, MA	2012	Massachusetts Institute of Technology	12	Private	Coating technology allows viscous liquids to move easily	Department of Defense, National Science Foundation	\$250,000
Lodo Therapeutics Corporation	New York, NY	2015	The Rockefeller University	5	Private	Using soil microbes to create therapeutics for resistant infectious diseases and cancer	National Institutes of Health	\$3,000,000
M3 Biotechnology	Seattle, WA	2011	Washington State University	15	Private	Therapeutics to alter progression of Alzheimer's disease and other forms of neuro-deterioration	Department of Defense, National Institutes of Health, National Science Foundation	\$840,000
Modulated Imaging, Inc.	Irvine, CA	2008	University of California, Irvine	5	Private	Light-based imaging devices for preventing, treating and curing medical skin conditions	Department of Defense, National Institutes of Health	not available

COMPANY	LOCATION	FOUNDED	UNIVERSITY	EMPLOYEES	STATUS	INNOVATION	FUNDING AGENCY	AMOUNT
Moterum, LLC	Greenville, SC	2014	University of South Florida	2	Private	Medical devices to aid mobility, rehabilitation and physical therapy	National Institutes of Health	\$103,000
Nanosys, Inc.	Milpitas, CA	2001	University of California, Berkeley and Lawrence Berkeley National Laboratory	100	Private	Quantum dot technology for color-accurate, energy efficient electronic displays	Department of Energy	not available
Naurex, Inc., acquired by Allergan	Evanston, IL	2008	Northwestern University	5	Acquired 2015	Therapies for central nervous system disorders	Department of Defense, National Institutes of Health	\$1,000,000
NemaMetrix Inc.	Eugene, OR	2011	University of Oregon	10	Private	Portable, fast ScreenChip system for environmental testing and drug discovery	National Institutes of Health	\$500,000
Network Perception	Champaign, IL	2013	University of Illinois at Urbana-Champaign	7	Private	Software illuminates firewall risks in complex computer networks	Department of Homeland Security, National Science Foundation	\$1,000,000
Nexgenia, Inc.	Seattle, WA	2011	University of Washington	8	Private	Magnetic nanoparticles to improve cell separations for applications in personalized immunotherapies	National Institutes of Health	\$10,000,000
NimbleGen Systems, Inc., operating as Roche NimbleGen	Madison, WI	1999	University of Wisconsin-Madison	85	Acquired 2007	High-density DNA microarrays for pharmaceutical research	National Institutes of Health	\$150,000
Open Water Power, Inc.	Somerville, MA	2013	Massachusetts Institute of Technology	10	Private	A technology for underwater energy storage and power generation	Department of Defense	\$400,000
Organovo Holdings, Inc.	San Diego, CA	2007	University of Missouri	115	Public	Functional, three-dimensional human tissues for research, development and therapy	National Science Foundation	\$5,000,000
Paper Battery Company	Troy, NY	2008	Rensselaer Polytechnic Institute	15	Private	An ultrathin, high energy, flexible "paper" battery	National Science Foundation	\$100,000
Personalis Inc.	Menlo Park, CA	2011	Stanford University	89	Private	Next-gen sequencing services for precision medicine	National Institutes of Health, National Science Foundation	not available
PhageTech, Inc.	Irvine, CA	2014	University of California, Irvine	11	Private	Bio-conducting platform for developing faster, simpler medical lab tests	National Institutes of Health, National Science Foundation	\$2,200,000
Pharmacyclics, an AbbVie Company	Sunnyvale, CA	1991	University of Texas at Austin	500	Acquired 2015	Cancer treatments and therapies for immune-mediated inflammatory diseases	National Institutes of Health, National Science Foundation	not available

COMPANY	LOCATION	FOUNDED	UNIVERSITY	EMPLOYEES	STATUS	INNOVATION	FUNDING AGENCY	AMOUNT
PhotoniCare, Inc.	Champaign, IL	2013	University of Illinois at Urbana-Champaign	9	Private	Tool enables physicians to look through the eardrum into the middle ear to see and better treat disease	National Institutes of Health, National Science Foundation	\$5,500,000
PLS 3rd Learning	Buffalo, NY	2007	University at Buffalo	70	Private	Web portals provide access to K-12 teaching materials in the U.S. and around the world	Department of Education	\$1,200,000
Preora Dagnostics Inc.	Evanston, IL	2015	Northwestern University	9	Private	A simple, non-invasive test for early cancer detection	National Institutes of Health, National Science Foundation	\$20,000,000
Promentis Pharmaceuticals, Inc.	Milwaukee, WI	2007	Marquette University	5	Private	Compounds for treating schizophrenia and other central nervous system disorders	National Institutes of Health	\$1,800,000
Promune, Inc.	Omaha, NE	2002	University of Nebraska	1	Private	Vaccine development technology that relies on the body's natural immune defenses	National Institutes of Health	\$2,900,000
Psikick	Ann Arbor, MI	2013	University of Michigan	25	Private	The world's lowest-power wireless sensing devices	National Science Foundation	\$3,100,000
Q-State Biosciences, Inc.	Cambridge, MA	2013	Harvard University	23	Private	Stem cell and optogenetic technologies for drug discovery	Department of Defense, National Institutes of Health	\$3,000,000
Quantitative Radiology Solutions LLC	Philadelphia, PA	2013	University of Pennsylvania	2	Private	Automatic Anatomy Recognition technology analyzes medical images to improve radiation therapy planning	National Institutes of Health	\$2,500,000
SAGE Therapeutics	Cambridge, MA	2010	University of California, Davis	62	Public	Medicines to treat life-threatening central nervous system disorders	Department of Defense	\$8,000,000
Scipher	Boston, MA	2014	Northeastern University	4	Private	Identifying new indications for existing safe drugs and predicting which patients will respond to a particular drug	National Institutes of Health	\$300,000
Semma Therapeutics	Cambridge, MA	2015	Harvard University	25	Private	Turning stem cells into insulin-producing cells for patients with type 1 diabetes	National Institutes of Health	not available

COMPANY	LOCATION	FOUNDED	UNIVERSITY	EMPLOYEES	STATUS	INNOVATION	FUNDING AGENCY	AMOUNT
Sensorygen, Inc.	Encinitas, CA	2014	University of California, Riverside	3	Private	Naturally occurring, non-toxic chemicals that modify smell and taste mediated behavior	National Institutes of Health	\$1,200,000
Silatronix	Madison, WI	2007	University of Wisconsin-Madison	16	Private	Organosilicon materials that improve the safety and enable extreme performance of lithium ion batteries	National Institute of Standards and Technology, National Science Foundation	\$1,680,000
SLIPS Technologies, Inc.	Cambridge, MA	2014	Harvard University	12	Private	Fully slippery coating that solves sticky surface problems in medical, industrial and consumer applications	Department of Defense, Department of Energy	\$3,000,000
SOAIR LLC	University, MS	2006	University of Mississippi	4	Private	Risk monitoring technology to prevent falls in older adults	Department of Defense	\$537,000
SomaLogic, Inc.	Boulder, CO	2000	University of Colorado Boulder	168	Private	Proteomics technology for detecting and diagnosing disease	National Institutes of Health	\$300,000
Spheryx, Inc.	New York, NY	2014	New York University	7	Private	Suspension analysis at the sub-microscopic level	Department of Defense, National Science Foundation	\$2,000,000
Stasys Medical Corporation	Seattle, WA	2013	University of Washington	4	Private	Point-of-care device that measures blood clotting ability of trauma patients and patients taking anti-platelet medications	Department of Defense	\$300,000
Stratatech, a Mallinckrodt Company	Madison, WI	2000	University of Wisconsin-Madison	60	Acquired 2016	Skin substitutes for research and treatment of burns, wounds and complex skin defects	National Institutes of Health	\$2,860,000
SynchroPET Inc.	Stony Brook, NY	2013	Stony Brook University	3	Private	World's smallest PET scanners, enabling simultaneous PET/MRI devices	Department of Energy	\$10,000,000
Tableau Software	Seattle, WA	2003	Stanford University	3,200	Public	Transformative software that uses computer graphics to improve data analysis and presentation	Department of Defense	not available
Thermal Expansion Solutions, LLC (dba Allvar)	College Station, TX	2014	Texas A&M University	3	Private	Programmable metal alloys that change shape with temperature for use in optics	National Science Foundation	\$250,000

COMPANY	LOCATION	FOUNDED	UNIVERSITY	EMPLOYEES	STATUS	INNOVATION	FUNDING AGENCY	AMOUNT
Topera, Inc., operating as Abbott Electrophysiology	Menlo Park, CA	2010	University of California, San Diego	100	Acquired 2014	Mapping system for isolating the source of abnormal heart rhythms and pinpointing the location for treatment	National Institutes of Health	\$3,300,000
Transposagen Biopharma- ceuticals, Inc.	Lexington, KY	2003	University of Notre Dame	20	Private	Unique animal models, cell lines, stem cells and technologies for drug discovery	Department of Agriculture	\$275,000
Tri Alpha Energy Inc.	Foothill Ranch, CA	1998	University of California, Irvine	150	Private	Pursuing commercially competitive clean fusion energy	Department of Defense, Department of Energy	\$600,000
TriFusion Devices, a wholly owned subsidiary of Essentium Materials	College Station, TX	2016	Texas A&M University	4	Acquired 2016	3-D printing products and services for manufacturing custom prosthetics	Department of Defense, National Science Foundation	\$350,000
Tule Technologies LLC	Oakland, CA	2013	University of California, Davis	6	Private	Irrigation technology lets growers know when and how much to water their crops, maximizing yield and quality	Department of Agriculture	\$300,000
Universal Cells, Inc.	Seattle, WA	2013	University of Washington	12	Private	Universal donor cells for regenerative medicine	National Institutes of Health	\$30,600,000
Valtari Bio Inc.	Morgantown, WV	2014	West Virginia University	4	Private	A blood test for quick, accurate preliminary stroke diagnosis	Department of Defense, National Institutes of Health	\$1,615,000
Veriflow	San Jose, CA	2013	University of Illinois at Urbana- Champaign	18	Private	Network verification technology to prevent costly outages and breaches	National Science Foundation	\$581,000
Virtually Better, Inc.	Decatur, GA	1996	Emory University	24	Private	Virtual reality environments for treatment of behavioral and cognitive disorders	Department of Defense	\$33,000

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COMPANIES BY UNIVERSITY

Printable company fact sheets are available at www.sciencecoalition.org/successstories

Boston University

Beta Bionics, Inc.
Guavus Inc.
Klogene Therapeutics, Inc.

Columbia University

EpiBone, Inc.

Dartmouth

DoseOptics LLC
FreshAir Sensor LLC

Emory University

Virtually Better, Inc.

Florida State University

Auxadyne, LLC
BioFront Technologies

Harvard University

Q-State Biosciences, Inc.
Semma Therapeutics
SLIPS Technologies, Inc.

Johns Hopkins University

AsclepiX Therapeutics, LLC
Gemstone Biotherapeutics LLC

Marquette University

Promentis Pharmaceuticals, Inc.

Massachusetts Institute of Technology

LiquiGlide Inc.
Open Water Power, Inc.

New York University

Spheryx, Inc.

North Carolina State University

Hexatech Inc.

Northeastern University

Scipher

Northwestern University

Naurex, Inc., acquired by Allergan
Preora Dagnostics Inc.

Pace University

Codapillar Inc.

Penn State University

Conidio Tec, LLC
InterSeeder Technologies LLC

Princeton University

FORGE Life Science
GPB Scientific, LLC

Rensselaer Polytechnic Institute

Paper Battery Company

Stanford University

Personalis Inc.
Tableau Software

Stony Brook University

SynchroPET Inc.

Texas A&M University

CartoFusion Technologies, Inc.
ECM Technologies, LLC
Thermal Expansion Solutions, LLC (dba Allvar)
TriFusion Devices, a wholly owned subsidiary
of Essentium Materials

The Ohio State University

Core Quantum Technologies, Inc.

The Rockefeller University

ContraFect Corporation
Lodo Therapeutics Corporation

University at Buffalo

PLS 3rd Learning

University of Arizona

Acomni, LLC
Codelucia, LLC
Dataware Ventures, LLC

University of California, Berkeley

Caribou Biosciences, Inc.

**University of California, Berkeley &
Lawrence Berkeley National Laboratory**

Nanosys, Inc.

University of California, Davis

SAGE Therapeutics
Tule Technologies LLC

University of California, Irvine

Modulated Imaging, Inc.
PhageTech, Inc.
Tri Alpha Energy Inc.

University of California, Riverside

Sensorygen, Inc.

University of California, San Diego

Emotient, now part of Apple
Topera, Inc., operating as
Abbott Electrophysiology

University of California, San Francisco

eFFector Therapeutics

University of California, Santa Barbara

CytomX Therapeutics, Inc.

University of California, Santa Cruz

InkTank, now part of Red Hat

University of Colorado Boulder

Ball Aerospace & Technologies Corp.
Kapteyn-Murnane Laboratories Inc.
SomaLogic, Inc.

University of Delaware

Genome Profiling LLC

University of Florida

AGTC

University of Illinois at Chicago

3PrimeDx, Inc.

University of Illinois at Urbana-Champaign

Network Perception
PhotoniCare, Inc.
Veriflow

University of Iowa

IDx, LLC

University of Kansas

HylaPharm

University of Maryland

gel-e Life Sciences

University of Michigan

Crossbar, Inc.
HistoSonics, Inc.
Psikick

University of Minnesota

FastBridge Learning, LLC

University of Mississippi

SOAIR LLC

University of Missouri

Organovo Holdings, Inc.

University of Nebraska

Epicrop Technologies Inc.
Promeune, Inc.

University of New Hampshire

Itaconix Corporation, a wholly-owned
subsidiary of Revolymer plc

University of New Mexico

IntelliCyt Corporation

University of Notre Dame

Emu Solutions Inc.
Transposagen Biopharmaceuticals, Inc.

University of Oregon

NemaMetrix Inc.

University of Pennsylvania

Liquid Biotech USA, Inc.
Quantitative Radiology Solutions LLC

University of Rochester

Adarza Biosystems, Inc.
Clerio Vision, Inc.

University of South Florida

Agilis Biotherapeutics
Moterum, LLC

University of Texas at Austin

Aeglea BioTherapeutics
Pharmacyclics, an AbbVie Company

University of Utah

Blackrock Microsystems

University of Washington

AnswerDash, Inc.
Aortica Corporation
Applied Dexterity, Inc.
BluHaptics, Inc.
Nexgenia, Inc.
Stasys Medical Corporation
Universal Cells, Inc.

University of Wisconsin-Madison

NimbleGen Systems, Inc.,
operating as Roche NimbleGen
Silatronix
Stratatech, a Mallinckrodt Company

Washington State University

M3 Biotechnology

West Virginia University

Valtari Bio Inc.

Yale University

Arvinas, Inc.

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COMPANIES BY FUNDING AGENCY

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Department of Agriculture

BioFront Technologies
Conidio Tec, LLC
IDx, LLC
InterSeeder Technologies LLC
Transposagen Biopharmaceuticals, Inc.
Tule Technologies LLC

Department of Defense

Applied Dexterity, Inc.
Auxadyne, LLC
Ball Aerospace & Technologies Corp.
Blackrock Microsystems
ContraFect Corporation
Emotient, now part of Apple
Emu Solutions Inc.
GPB Scientific, LLC
Hexatech Inc.
HylaPharm
LiquiGlide Inc.
M3 Biotechnology
Modulated Imaging, Inc.
Naurex, Inc., acquired by Allergan
Open Water Power, Inc.
Q-State Biosciences, Inc.
SAGE Therapeutics
SLIPS Technologies, Inc.
SOAIR LLC
Spheryx, Inc.
Stasys Medical Corporation
Tableau Software
Tri Alpha Energy, Inc.
TriFusion Devices, a wholly owned subsidiary
of Essentium Materials
Valtari Bio Inc.
Virtually Better, Inc.

Department of Education

FastBridge Learning, LLC
PLS 3rd Learning

Department of Energy

Epicrop Technologies Inc.
InkTank, now part of Red Hat
Nanosys, Inc.
SLIPS Technologies, Inc.
SynchroPET Inc.
Tri Alpha Energy Inc.

Department of Homeland Security

Network Perception

Department of Veterans Affairs

Auxadyne, LLC
IDx, LLC

National Institutes of Health

3PrimeDx, Inc.
Adarza Biosystems, Inc.
Aeglea BioTherapeutics
Agilis Biotherapeutics
AGTC
Aortica Corporation
Arvinas, Inc.
AsclepiX Therapeutics, LLC
Beta Bionics, Inc.
BioFront Technologies
Blackrock Microsystems
Caribou Biosciences, Inc.
Clerio Vision, Inc.
CytomX Therapeutics, Inc.
DoseOptics LLC
ECM Technologies, LLC
eFFector Therapeutics
Emotient, now part of Apple

National Institutes of Health *continued*

EpiBone, Inc.
FORGE Life Science
FreshAir Sensor LLC
Gemstone Biotherapeutics LLC
GPB Scientific, LLC
HistoSonics, Inc.
HylaPharm
IDx, LLC
IntelliCyt Corporation
Klogene Therapeutics, Inc.
Liquid Biotech USA, Inc.
Lodo Therapeutics Corporation
M3 Biotechnology
Modulated Imaging, Inc.
Moterum, LLC
Naurex, Inc., acquired by Allergan
NemaMetrix Inc.
Nexgenia, Inc.
NimbleGen Systems, Inc., operating as
 Roche NimbleGen
Personalis Inc.
PhageTech, Inc.
Pharmacyclics, an AbbVie Company
PhotoniCare, Inc.
Preora Dagnostics Inc.
Promentis Pharmaceuticals, Inc.
Pronmune, Inc.
Q-State Biosciences, Inc.
Quantitative Radiology Solutions LLC
Scipher
Semma Therapeutics
Sensorygen, Inc.
SomaLogic, Inc.
Stratatech, a Mallinckrodt Company
Topera, Inc., operating as
 Abbott Electrophysiology
Universal Cells, Inc.
Valtari Bio Inc.

National Institute of Standards and Technology

Silatronix

National Science Foundation

Acomni, LLC
AnswerDash, Inc.
BluHaptics, Inc.
Caribou Biosciences, Inc.
CartoFusion Technologies, Inc.
Codapillar Inc.
Codelucia, LLC
Core Quantum Technologies, Inc.
Crossbar, Inc.
CytomX Therapeutics, Inc.
Dataware Ventures, LLC
Emotient, now part of Apple
Epicrop Technologies Inc.
FreshAir Sensor LLC
gel-e Life Sciences
Genome Profiling LLC
GPB Scientific, LLC
Guavus Inc.
Itaconix Corporation, a wholly-owned
 subsidiary of Revolmer plc
Kapteyn-Murnane Laboratories Inc.
LiquiGlide Inc.
M3 Biotechnology
Network Perception
Organovo Holdings, Inc.
Paper Battery Company
Personalis Inc.
PhageTech, Inc.
Pharmacyclics, an AbbVie Company
PhotoniCare, Inc.
Preora Dagnostics Inc.
Psikick
Silatronix
Spheryx, Inc.
Thermal Expansion Solutions, LLC (dba Allvar)
TriFusion Devices, a wholly owned subsidiary
 of Essentium Materials
Veriflow

COMPANIES BY STATE

Printable company fact sheets are available at www.sciencecoalition.org/successstories

Arizona

Acomni, LLC
Codelucia, LLC
Dataware Ventures, LLC

California

Caribou Biosciences, Inc.
Crossbar, Inc.
CytomX Therapeutics, Inc.
eFFector Therapeutics
Emotient, now part of Apple
Guavus Inc.
Modulated Imaging, Inc.
Nanosys, Inc.
Organovo Holdings, Inc.
Personalis Inc.
PhageTech, Inc.
Pharmacyclics, an AbbVie Company
Sensorygen, Inc.
Topera, Inc., operating as
 Abbott Electrophysiology
Tri Alpha Energy Inc.
Tule Technologies LLC
Veriflow

Colorado

Ball Aerospace & Technologies Corp.
Kapteyn-Murnane Laboratories Inc.
SomaLogic, Inc.

Connecticut

Arvinas, Inc.

Delaware

Genome Profiling LLC

Florida

AGTC
Auxadyne, LLC
BioFront Technologies

Georgia

Virtually Better, Inc.

Illinois

3PrimeDx, Inc.
Naurex, Inc., acquired by Allergan
Network Perception
PhotoniCare, Inc.
Preora Dagnostics Inc.

Indiana

Emu Solutions Inc.

Iowa

IDx, LLC

Kansas

HylaPharm

Kentucky

Transposagen Biopharmaceuticals, Inc.

Maryland

AsclepiX Therapeutics, LLC
gel-e Life Sciences
Gemstone Biotherapeutics LLC

Massachusetts

Agilis Biotherapeutics
Beta Bionics, Inc.
Klogene Therapeutics, Inc.
LiquiGlide Inc.
Open Water Power, Inc.
Q-State Biosciences, Inc.
SAGE Therapeutics
Scipher
Semma Therapeutics
SLIPS Technologies, Inc.

Michigan

HistoSonics, Inc.
Psikick

Minnesota

FastBridge Learning, LLC

Mississippi

SOAIR LLC

Nebraska

Epicrop Technologies Inc.
Prommune, Inc.

New Hampshire

DoseOptics LLC
FreshAir Sensor LLC
Itaconix Corporation, a wholly-owned subsidiary of Revolymer plc

New Mexico

IntelliCyt Corporation

New York

Adarza Biosystems, Inc.
Clerio Vision, Inc.
Codapillar Inc.
ContraFect Corporation
EpiBone, Inc.
Lodo Therapeutics Corporation
Paper Battery Company
PLS 3rd Learning
Spheryx, Inc.
SynchroPET Inc.

North Carolina

Hexatech Inc.
InkTank, now part of Red Hat

Ohio

Core Quantum Technologies, Inc.

Oregon

NemaMetrix Inc.

Pennsylvania

Conidio Tec, LLC
FORGE Life Science
InterSeeder Technologies LLC
Liquid Biotech USA, Inc.
Quantitative Radiology Solutions LLC

South Carolina

Moterum, LLC

Texas

Aeglea BioTherapeutics
CartoFusion Technologies, Inc.
ECM Technologies, LLC
Thermal Expansion Solutions, LLC (dba Allvar)
TriFusion Devices, a wholly owned subsidiary of Essentium Materials

Utah

Blackrock Microsystems

Virginia

GPB Scientific, LLC

Washington

AnswerDash, Inc.
Aortica Corporation
Applied Dexterity, Inc.
BluHaptics, Inc.
M3 Biotechnology
Nexgenia, Inc.
Stasys Medical Corporation
Tableau Software
Universal Cells, Inc.

West Virginia

Valtari Bio Inc.

Wisconsin

NimbleGen Systems, Inc., operating as Roche NimbleGen
Promentis Pharmaceuticals, Inc.
Silatronix
Stratatech, a Mallinckrodt Company

SPARKING ECONOMIC GROWTH VOLUME 1 AND 2 COMPANIES

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The companies listed here are companies that were highlighted in one of the two earlier volumes of **Sparking Economic Growth**, which were released in 2010 and 2013. Of the 200 companies contained in Volume 1 and 2, 176 are operational today or have successfully merged with or been acquired by another company. Companies that have gone out of business are not listed. Companies are listed by their affiliated university.

Arizona State University

AzERx, Inc. (part of Capstone Therapeutics)
Molecular Imaging Inc. (part of Agilent)

Auburn University

HaloSource, Inc.

Boston University

Allegro Diagnostics
Sample6 Technologies
Sand9 (technology acquired by
Analog Devices Inc. 2015)

Brown University

Acoustic Magic Inc.
Nabsys
Tivorsan Pharmaceuticals

The City University of New York

Phoebus Optoelectronics LLC

Columbia University

RemoteReality

Cornell University

Kionix Inc (wholly owned subsidiary
of the ROHM Group)
Pacific Biosciences

Dartmouth

Immunext

Emory University

GeoVax Labs Inc.
Pharmasset Inc. (acquired by Gilead 2011)
Syntermed Inc.
Triangle Pharmaceutical
(acquired by Gilead Sciences 2003)
Clearside Biomedical, Inc.
Inhibikase Therapeutics, Inc.
Octogen Corporation (acquired by Ipsen 2008)

Harvard University

Orbital Science Corporation
(Orbital ATK Inc. as of 2015)
RainDance Technologies
Diagnostics for All (DFA)
Genocea Biosciences
Infinity Pharmaceuticals

Indiana University

FAST Diagnostics
(now called FAST Biomedical)
ImmuneWorks
Therametric Tech Inc.

Johns Hopkins University

Reactive NanoTechnologies Inc.
(acquired by Indium Corporation 2009)

Massachusetts Institute of Technology

Cerulean Pharma Inc.
Cognex Corporation
iRobot Corporation
Momenta Pharmaceuticals
Akamai Technology, Inc.
WiTricity Corporation

Michigan Technological University

Aursos Inc.
ThermoAnalytics Inc.

New York University

Spin Transfer Technologies
SyntheZyme

North Carolina State University

BioMarck Pharmaceuticals
BioResource International (BRI)
CREE, Inc.
SAS
Agile Sciences, Inc.
Galaxy Diagnostics, Inc.
ImagineOptix
Physcient, Inc.

Northeastern University

Akrivis Technologies
Metamagnetics Inc.
Novobiotic

Northwestern University

American BioOptics
Polyera Corporation

Pennsylvania State University

Melanovus Oncology (acquired by
Cipher Pharmaceuticals 2015)
Strategic Polymers Inc. (now Novesentis)
WatchStander

Princeton University

BioNanomatrix (now BioNano Genomics)
TetraLogic Pharm
Universal Display Corporation
Vorbeck Materials Inc.
Aculon, Inc.
Liquid Light
TAG Optics Inc.

Rensselaer Polytechnic Institute

Crystal IS, Inc.

Rutgers University

TYRX, Inc.

Stanford University

Amati Communications Corporation
(acquired by Texas Instruments 1997)
Cisco Systems
Genentech (a member of the Roche Group)
Google
Sun Microsystems (acquired by Oracle 2010)
SunPower Corporation
Xenogen (part of PerkinElmer)
KAI Pharmaceuticals
(acquired by Amgen 2012)
Lyncean Technologies, Inc.
Picarro, Inc.

Stony Brook University

General Sentiment
MesoScribe Technologies Inc.

Syracuse University

AptaMatrix
CollabWorx

Texas A&M University

framergy
MacuCLEAR, Inc.

The Ohio State University

Nanofiber Solutions

University at Buffalo

Buffalo BioBlower Tech
Kinex Pharmaceuticals (now Athenex)
ONY, Inc.
Tonus Therapeutics

University of California, Berkeley

Cadence Design Systems
Amyris, Inc.

University of California, Davis

Dysonics Corporation

University of California, Irvine

ALEKS Corporation
Hiperwall Inc.
SoundCure

University of California, Los Angeles

Agensys, Inc.
ArmaGen Technologies, Inc.
Solarmer Energy Inc.
Holomic, LLC (now CELLMIC)
Tribogenics

University of California, San Diego

Genomatica, Inc.
Senomyx, Inc.

University of California, Santa Barbara

Aurrion
Eucalyptus Systems
Transphorm

University of Chicago

Chromatin, Inc.
Integrated Genomics
Maroon Biotech
Advanced Diamond Technologies (ADT), Inc.
Wisegene

University of Colorado Boulder

ColdQuanta, Inc.
LineRate Systems, Inc.

University of Florida

Banyan Biomarkers, Inc.
Sharklet Technologies, Inc.
Sinmat
Verenium Corp. (acquired by BASF 2013)
Axogen
NanoPhotonica

University of Illinois at Chicago

Cell Biologics
Cell Habitats
EPIR Technologies
Immersive Touch
Mobitrac, Inc. (acquired by Fluensee 2006)
OrthoAccel Technologies Inc.

University of Illinois at Urbana-Champaign

Eden Park Illumination Inc.
Semprius
TetraVitae Bioscience
Autonomic Material, Inc.
Xerion Advanced Battery Corp.

University of Iowa

Integrated DNA Technologies (IDT), Inc.

University of Kansas

CyDex Pharmaceuticals, Inc.
(acquired by Ligand Pharmaceuticals 2011)

University of Kentucky

Allylix, Inc. (acquired by Evolva 2014)
Mersive Technologies
Hummingbird Nano Inc.

University of Maryland

Zymetis Inc.
OmniSpeech, LLC

University of Michigan

Arbor Networks
HealthMedia, Inc.
(acquired by Johnson & Johnson 2008)
Lycera
Quantum Signal, LLC

University of Minnesota

Image Sensing Systems Inc.
Heat Mining Company, LLC (now TerraCOH)
Steady State Imaging, LLC
(acquired by GE Healthcare 2011)

University of Nebraska

J.A. Woollam Co.
LI-COR Biosciences
Virtual Incision Corporation
Ground Fluor Pharmaceuticals, Inc.
Trak Surgical, Inc.

University of Pennsylvania

Advaxis, Inc.
Avid Radiopharmaceuticals Inc.
VGX Pharmaceuticals
Axonia Medical, Inc.
CytoVas, LLC
Graphene Frontiers
RightCare Solutions, Inc.
(acquired by naviHealth 2015)

University of Rochester

iCardiac Technologies
Praxis Biologics (part of Pfizer)
Vaccinex Inc.
Koning Corporation
Science Take Out

University of Southern California

Audyssey Laboratories
Language Weaver
(now SDL Language Weaver)

University of South Florida

Nanopharma Technologies Inc.
Natura Therapeutics Inc.
Transgenex Nanobiotech Inc.
Saneron-CCEL Therapeutics

University of Texas at Austin

Molecular Imprints Inc.
(acquired by Canon 2014)

University of Utah

Myriad Genetics, Inc.

University of Virginia

Adenosine Therapeutics, LLC
(acquired by Clinical Data, Inc. 2008)
Directed Vapor Tech International

University of Wisconsin-Madison

FluGen Inc.
TomoTherapy Inc. (acquired by Accuray 2011)
Cellular Dynamics International (CDI), Inc.
Virent, Inc.

Virginia Tech

NanoSonic Inc.

Washington State University

Food Chain Safety

Wayne State University

Advaita Corporation

West Virginia University

Protea Bioscience Inc.

Yale University

Kolltan Pharmaceuticals, Inc.

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